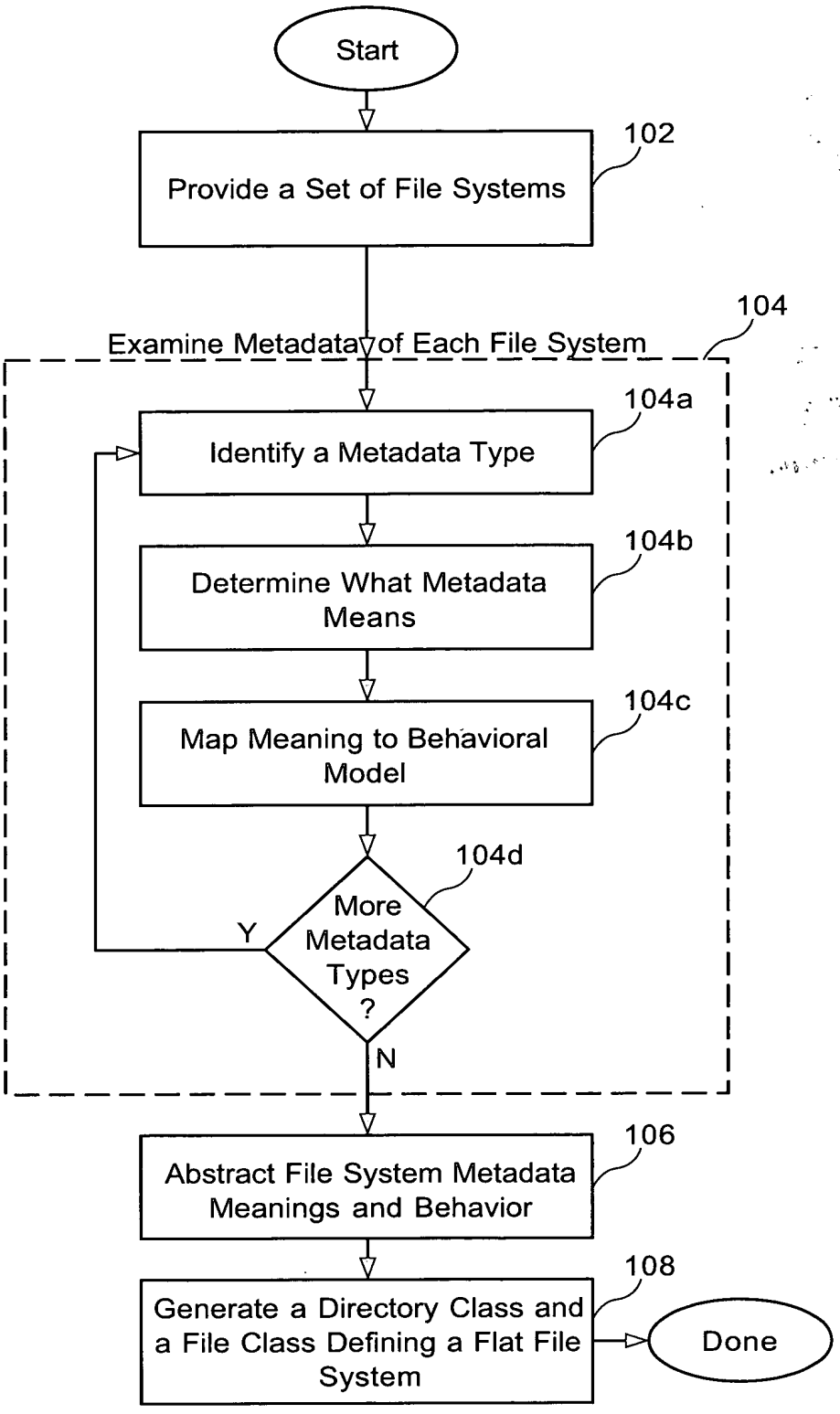
Start
100
Provide a Set of File Systems
102
Examine Metadata of Each File System
104
Identify a Metadata Type
104a
Determine What Metadata Means
104b
Map Meaning to Behavioral Model
104c
More Metadata Types ?
104d
Y
N
Abstract File System Metadata Meanings and Behavior
106
Generate a Directory Class and a File Class Defining a Flat File System
108
Done

FIG. 1

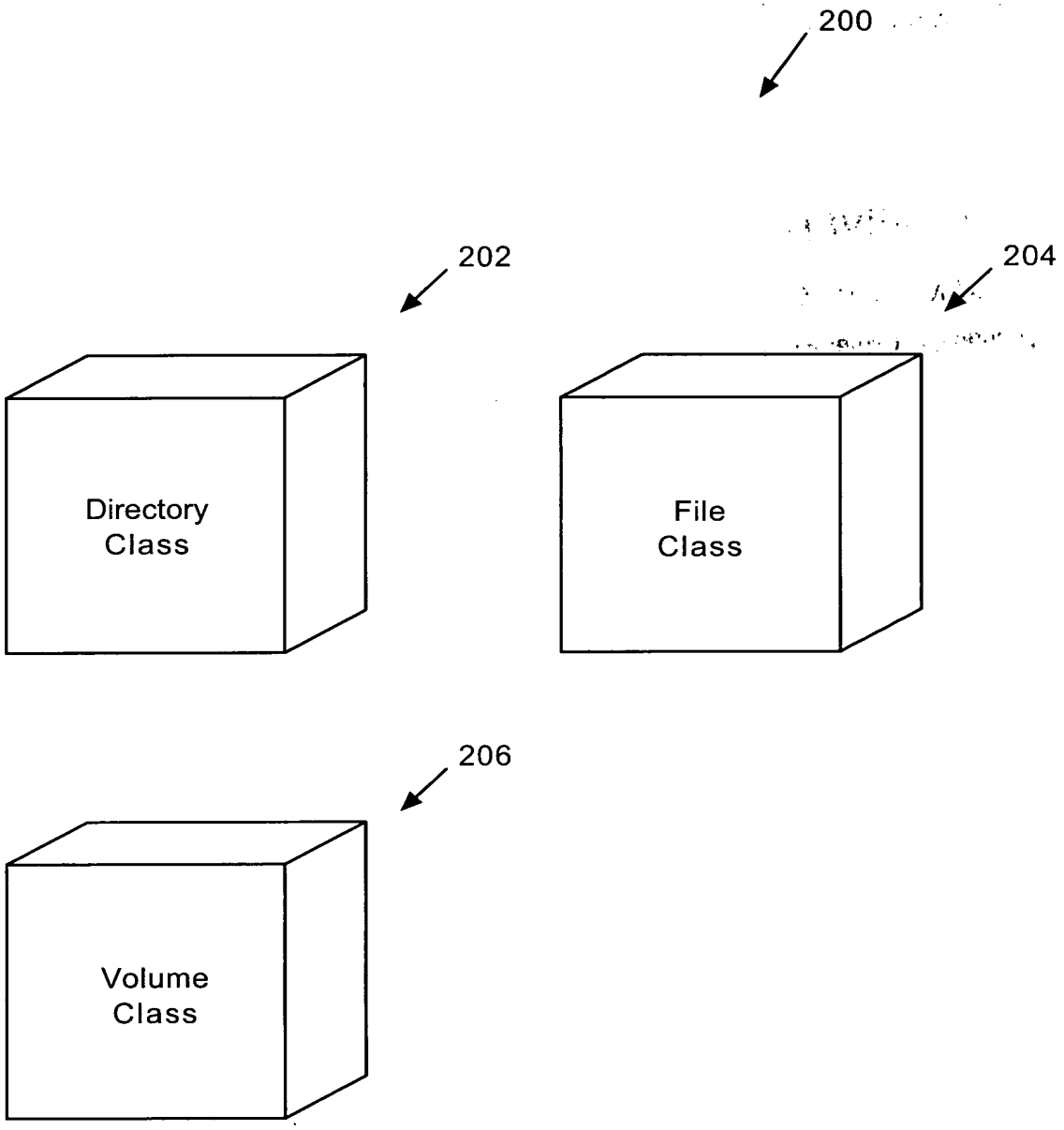

FIG. 2A

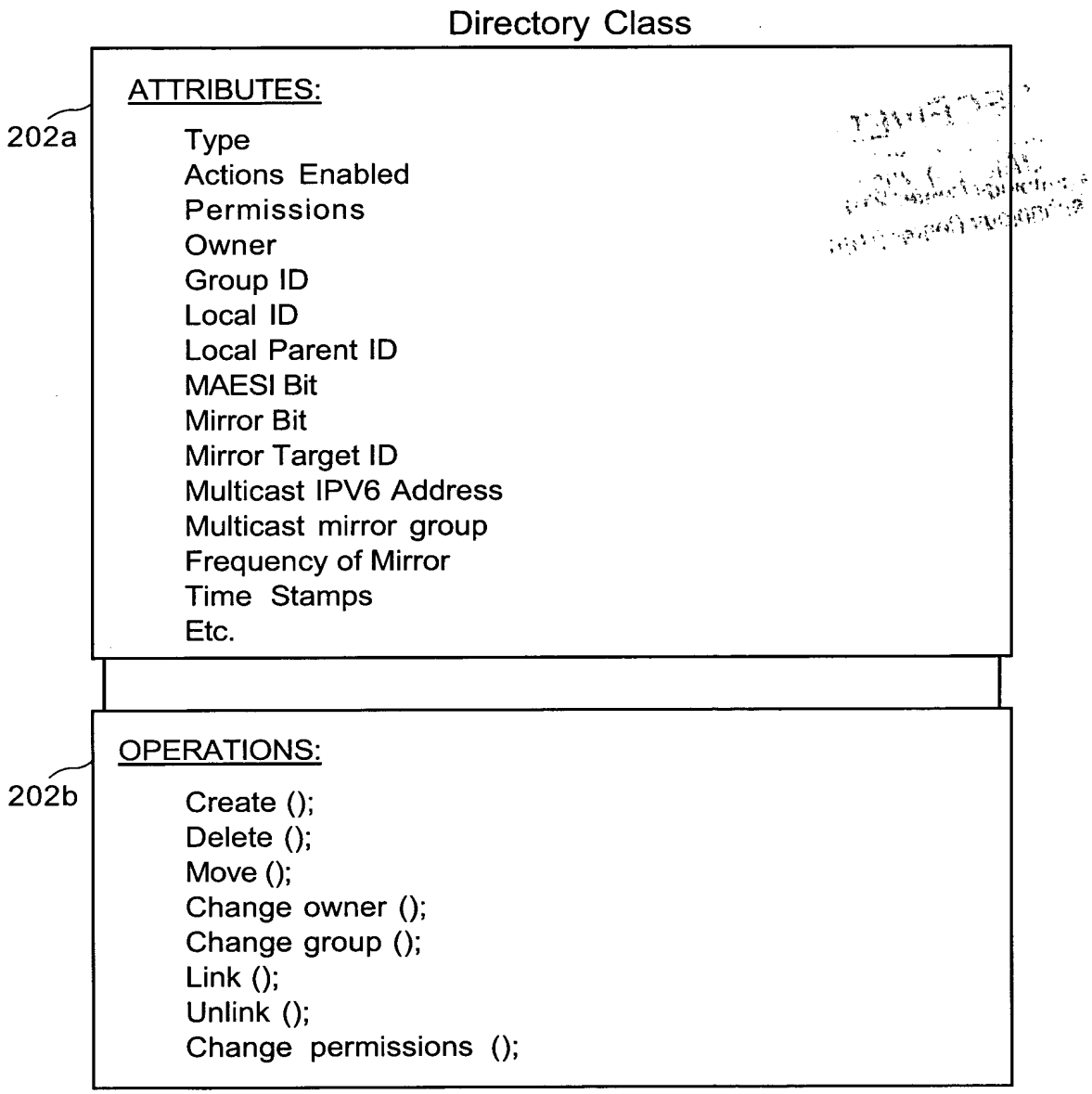
202
Directory Class
ATTRIBUTES:
202a
Type
Actions Enabled
Permissions
Owner
Group ID
Local ID
Local Parent ID
MAESI Bit
Mirror Bit
Mirror Target ID
Multicast IPV6 Address
Multicast mirror group
Frequency of Mirror
Time Stamps
Etc.
OPERATIONS:
202b
Create ();
Delete ();
Move ();
Change owner ();
Change group ();
Link ();
Unlink ();
Change permissions ();

FIG. 2B

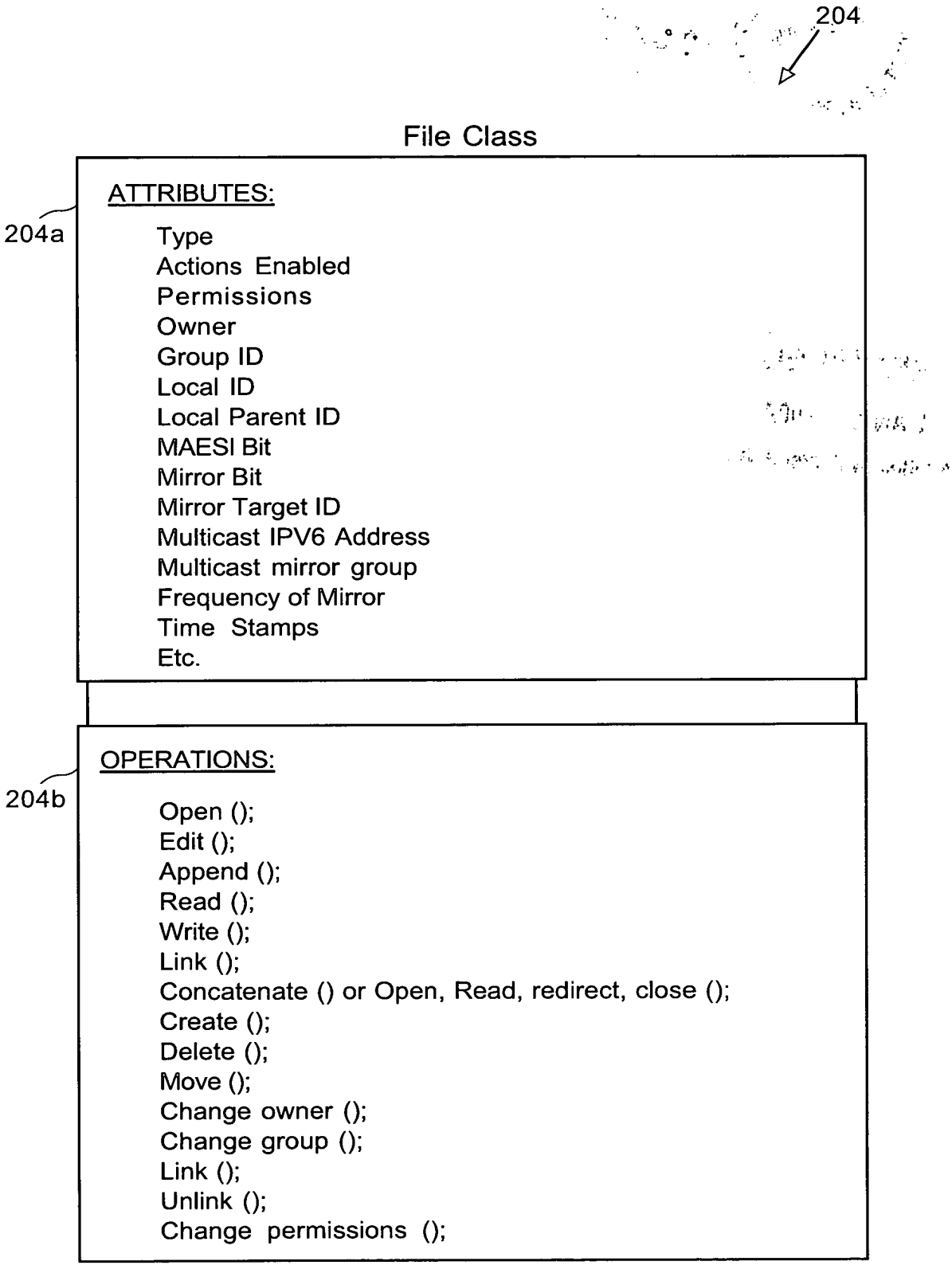
204
File Class
ATTRIBUTES:
204a
Type
Actions Enabled
Permissions
Owner
Group ID
Local ID
Local Parent ID
MAESI Bit
Mirror Bit
Mirror Target ID
Multicast IPV6 Address
Multicast mirror group
Frequency of Mirror
Time Stamps
Etc.
OPERATIONS:
204b
Open ();
Edit ();
Append ();
Read ();
Write ();
Link ();
Concatenate () or Open, Read, redirect, close ();
Create ();
Delete ();
Move ();
Change owner ();
Change group ();
Link ();
Unlink ();
Change permissions ();

FIG. 2C

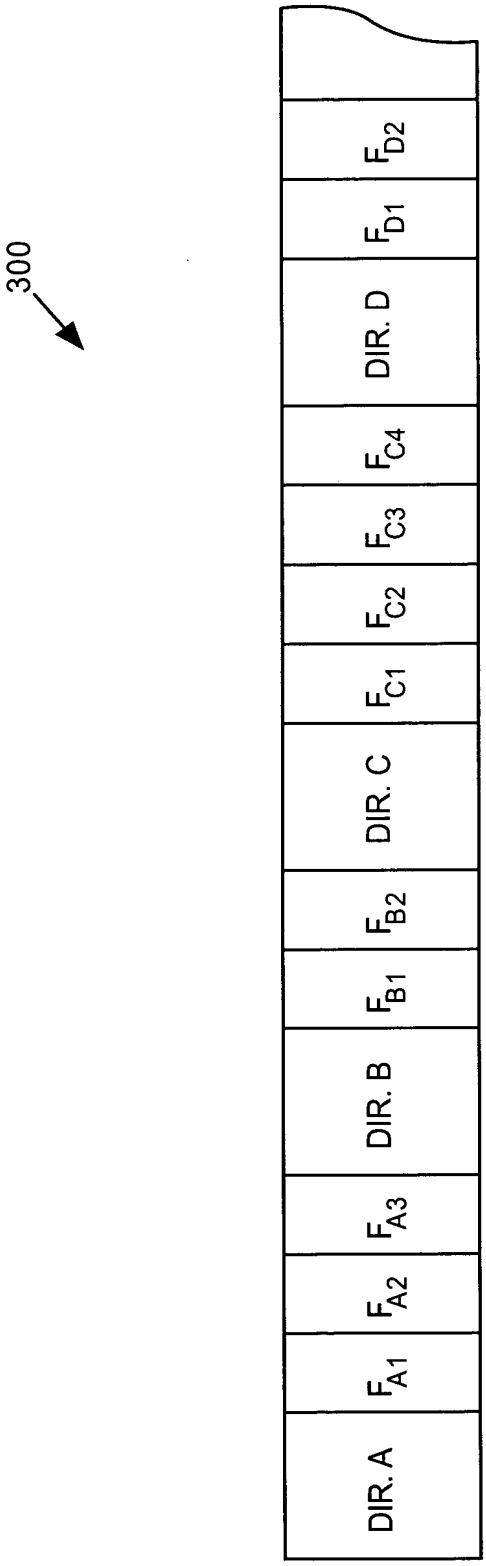
300
DIR. A
F_{A1}
F_{A2}
F_{A3}
DIR. B
F_{B1}
F_{B2}
DIR. C
F_{C1}
F_{C2}
F_{C3}
F_{C4}
DIR. D
F_{D1}
F_{D2}

FIG. 3A

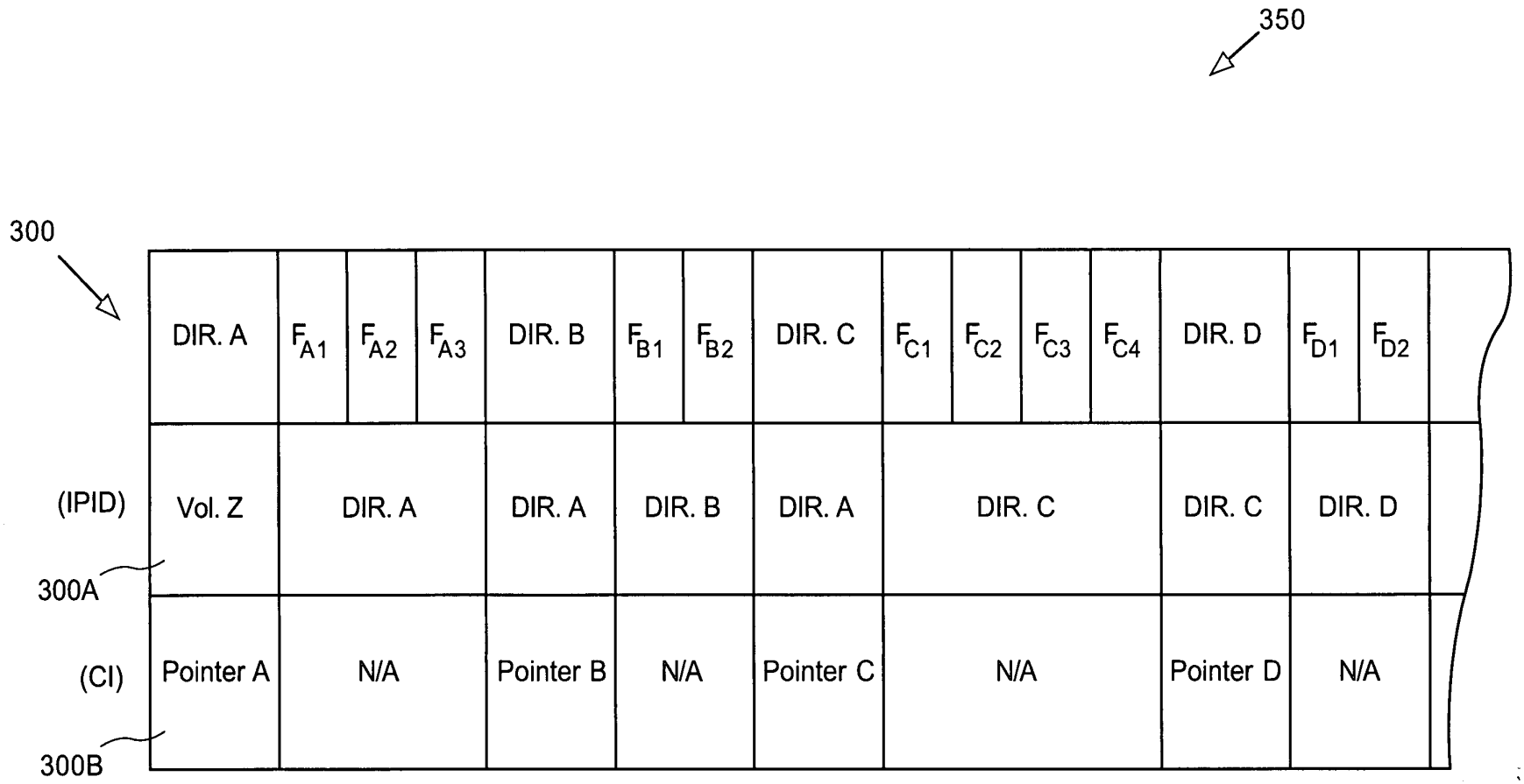
350
300
DIR. A
F_{A1}
F_{A2}
F_{A3}
DIR. B
F_{B1}
F_{B2}
DIR. C
F_{C1}
F_{C2}
F_{C3}
F_{C4}
DIR. D
F_{D1}
F_{D2}
(IPID)
Vol. Z
DIR. A
DIR. A
DIR. B
DIR. A
DIR. C
DIR. C
DIR. D
300A
(CI)
Pointer A
N/A
Pointer B
N/A
Pointer C
N/A
Pointer D
N/A
300B

FIG. 3B

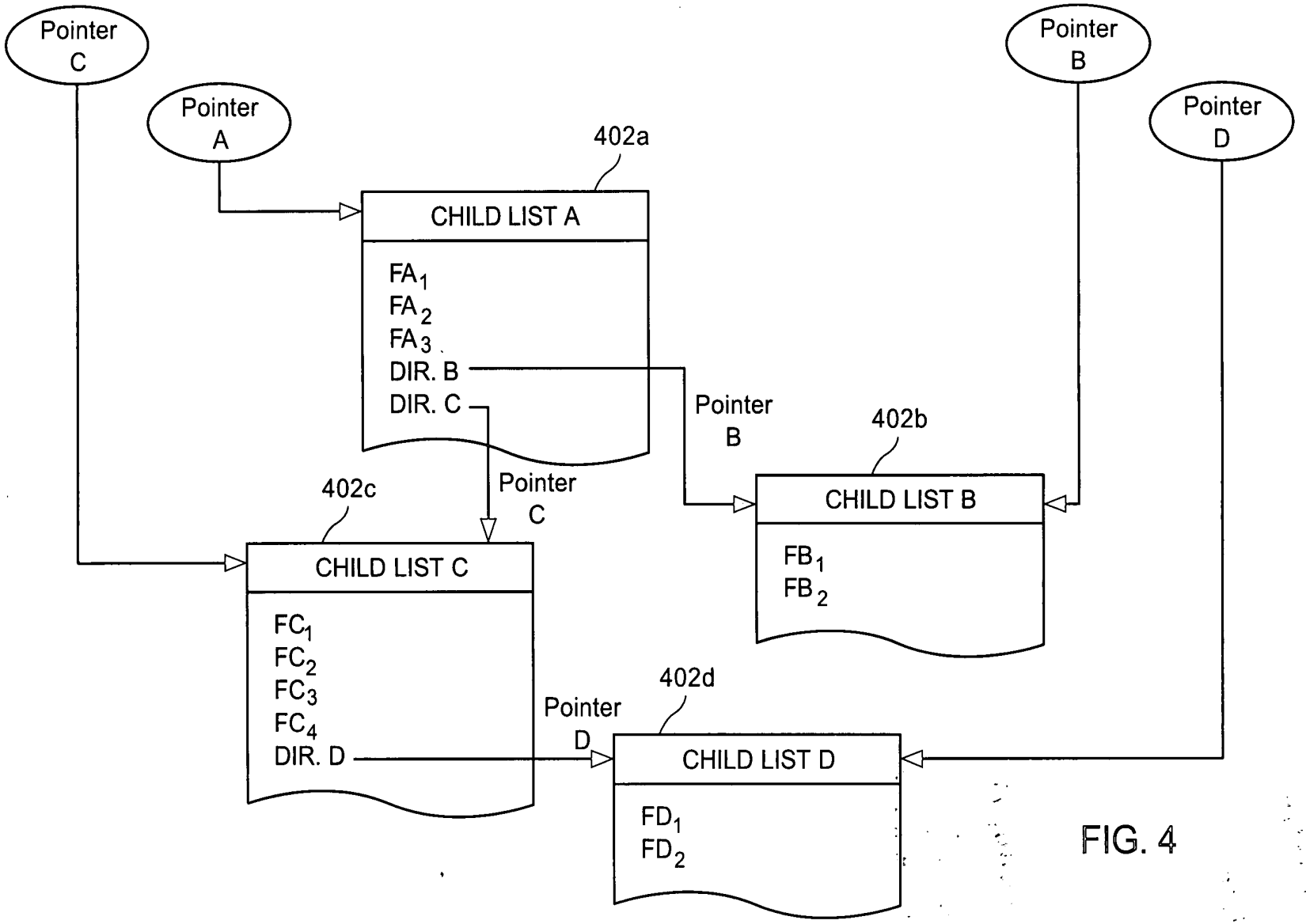
Pointer C
Pointer A
Pointer B
Pointer D
402a
CHILD LIST A
FA1
FA2
FA3
DIR. B
DIR. C
Pointer B
402b
CHILD LIST B
FB1
FB2
Pointer C
402c
CHILD LIST C
FC1
FC2
FC3
FC4
DIR. D
Pointer D
402d
CHILD LIST D
FD1
FD2

FIG. 4

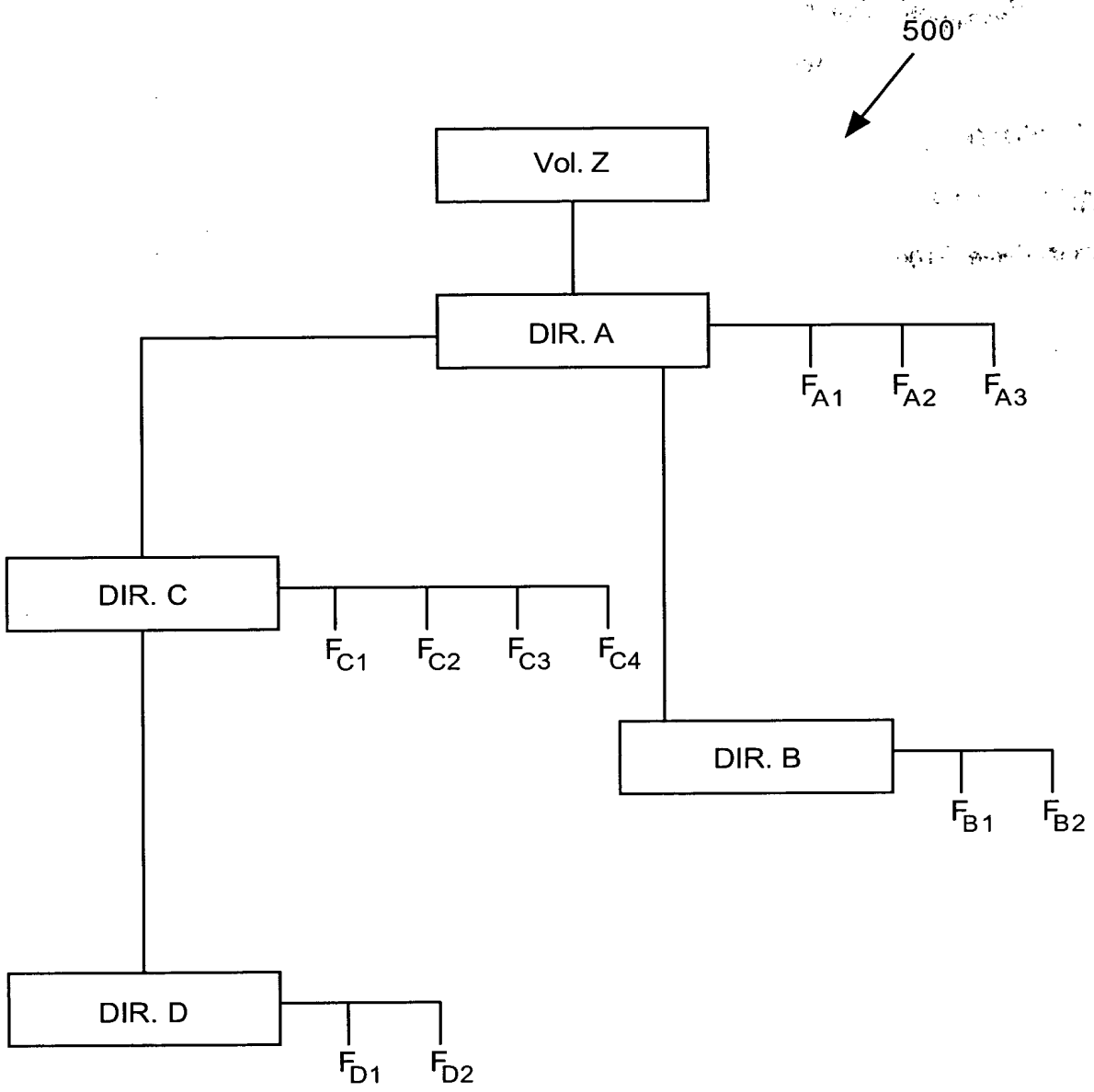
500
Vol. Z
DIR. A
F_{A1}
F_{A2}
F_{A3}
DIR. C
F_{C1}
F_{C2}
F_{C3}
F_{C4}
DIR. B
F_{B1}
F_{B2}
DIR. D
F_{D1}
F_{D2}

FIG. 5

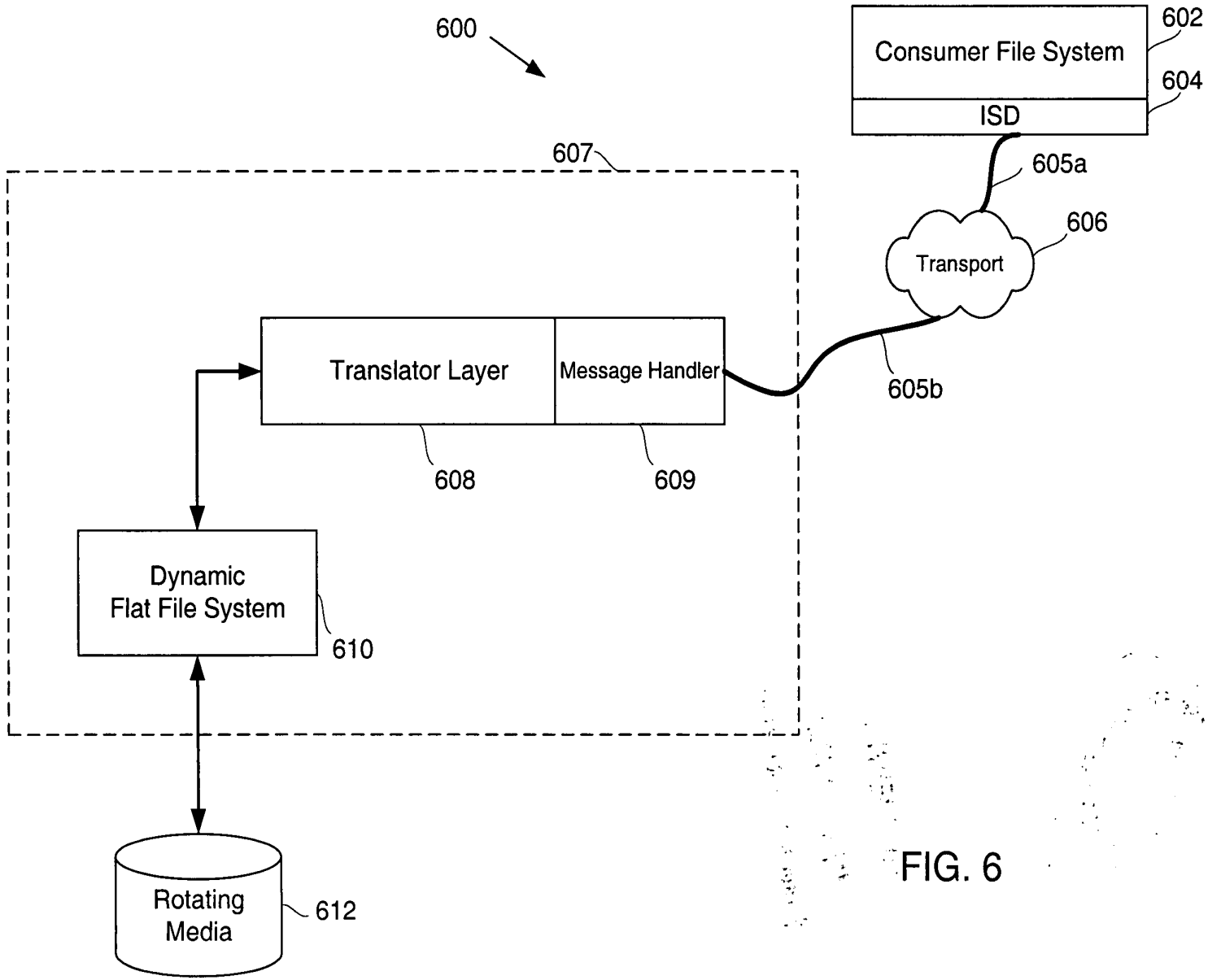
600
Consumer File System
602
ISD
604
607
605a
606
Transport
Translator Layer
Message Handler
605b
608
609
Dynamic
Flat File System
610
Rotating
Media
612

FIG. 6

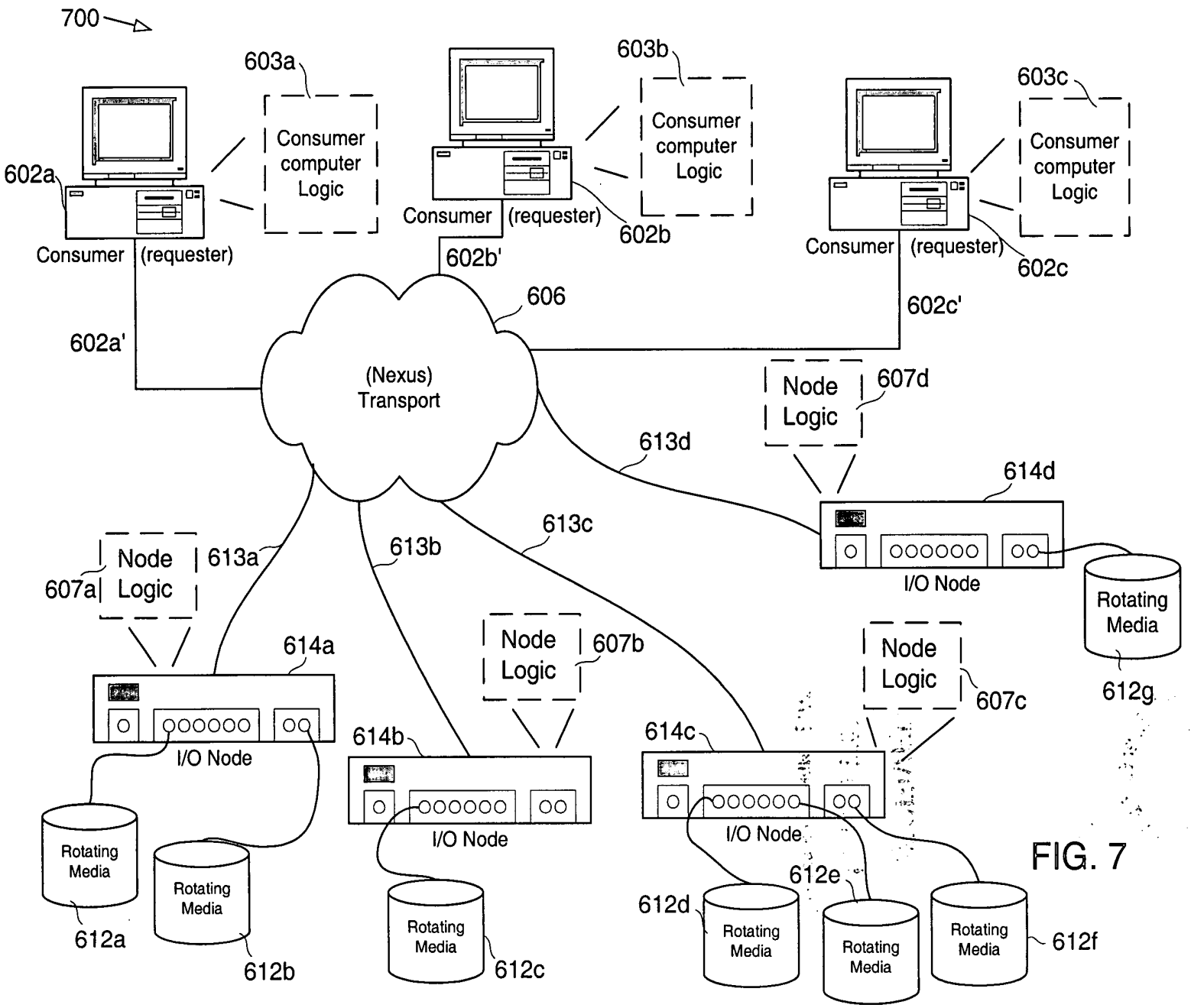
700
603a
Consumer computer Logic
602a
Consumer (requester)
603b
Consumer computer Logic
Consumer (requester)
602b
603c
Consumer computer Logic
Consumer (requester)
602c
602b'
602c'
602a'
606
(Nexus) Transport
Node Logic
607d
613d
614d
I/O Node
Rotating Media
612g
Node Logic
607a
613a
613b
613c
614a
I/O Node
Node Logic
607b
Node Logic
607c
614b
I/O Node
614c
I/O Node
Rotating Media
612a
Rotating Media
612b
Rotating Media
612c
612d
Rotating Media
612e
Rotating Media
Rotating Media
612f

FIG. 7

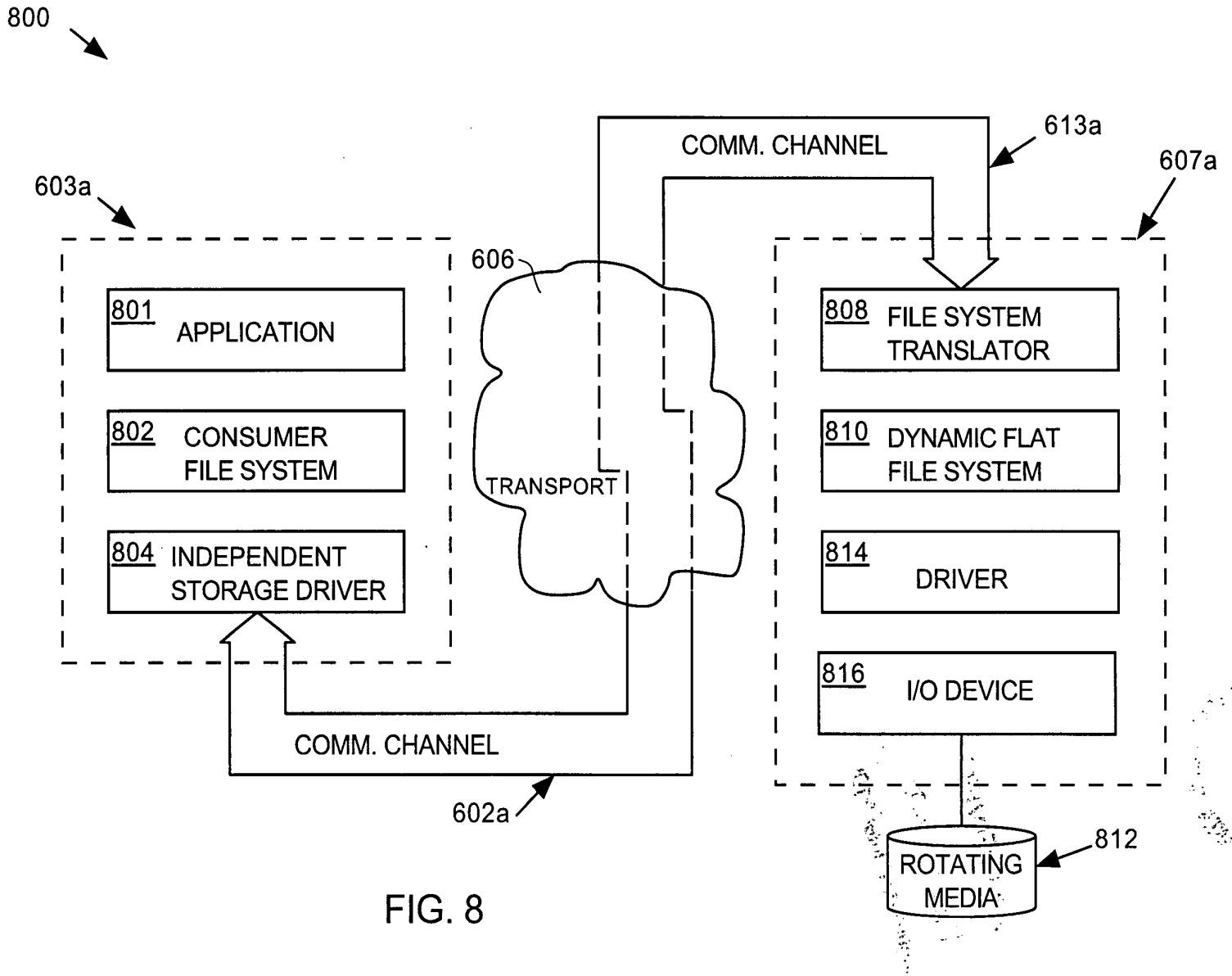
800
603a
801
APPLICATION
802
CONSUMER
FILE SYSTEM
804
INDEPENDENT
STORAGE DRIVER
606
TRANSPORT
COMM. CHANNEL
613a
607a
808
FILE SYSTEM
TRANSLATOR
810
DYNAMIC FLAT
FILE SYSTEM
814
DRIVER
816
I/O DEVICE
COMM. CHANNEL
602a
812
ROTATING
MEDIA

FIG. 8

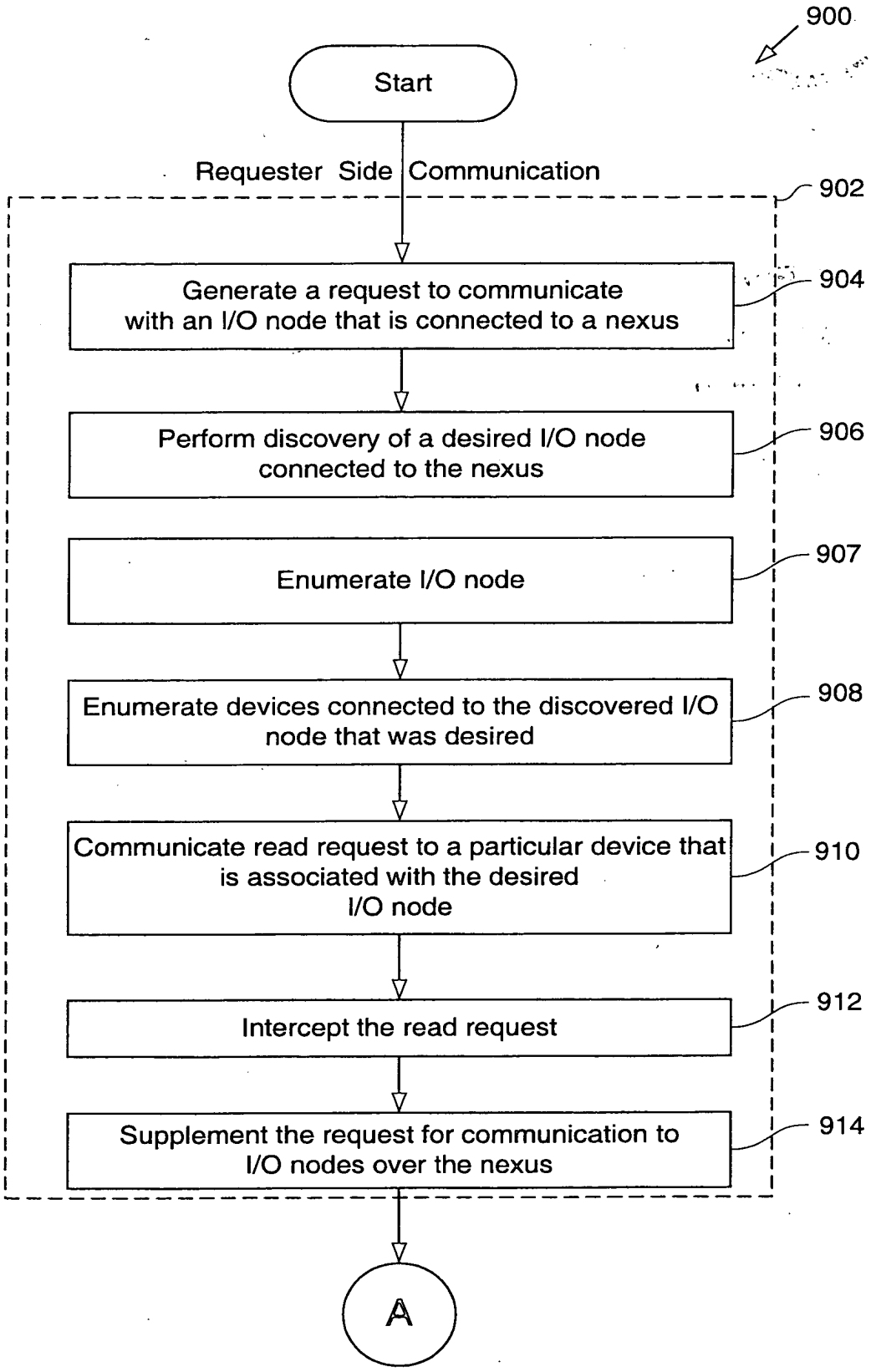
900
Start
Requester Side Communication
902
Generate a request to communicate with an I/O node that is connected to a nexus
904
Perform discovery of a desired I/O node connected to the nexus
906
Enumerate I/O node
907
Enumerate devices connected to the discovered I/O node that was desired
908
Communicate read request to a particular device that is associated with the desired I/O node
910
Intercept the read request
912
Supplement the request for communication to I/O nodes over the nexus
914
A

FIG. 9A

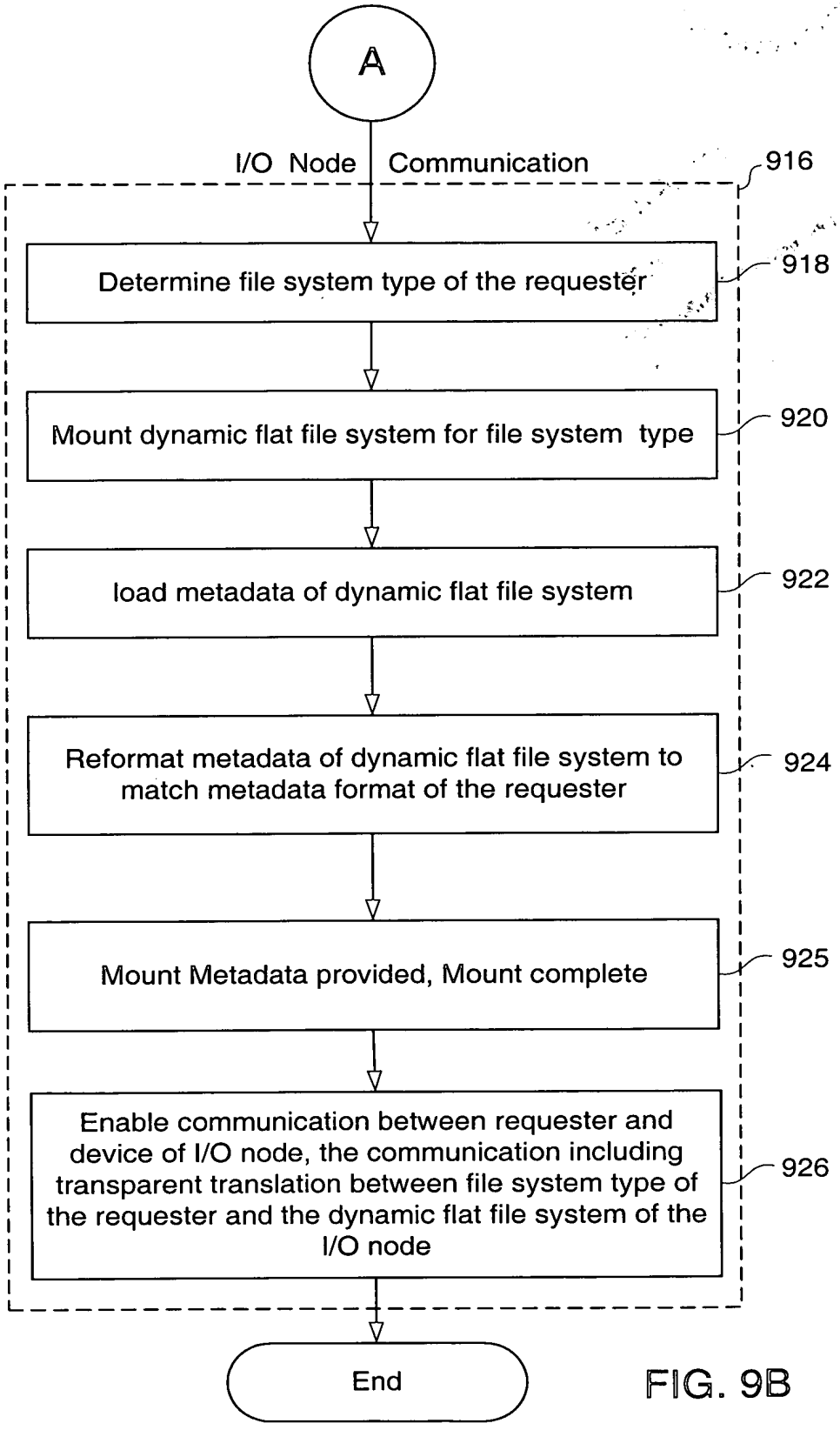
A
I/O Node Communication
916
Determine file system type of the requester
918
Mount dynamic flat file system for file system type
920
load metadata of dynamic flat file system
922
Reformat metadata of dynamic flat file system to match metadata format of the requester
924
Mount Metadata provided, Mount complete
925
Enable communication between requester and device of I/O node, the communication including transparent translation between file system type of the requester and the dynamic flat file system of the I/O node
926
End

FIG. 9B